AMENDMENTS TO THE CLAIMS

1-2. (Cancelled)

3. (Original) A single crystal substrate comprising:

a langasite substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis, and the substrate further has an Z'-axis perpendicular to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the langasite substrate having a crystal orientation defined by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which ϕ is 0°, θ is in a range of $12^\circ \leq \theta \leq 17^\circ$, and ψ is in a range of $73^\circ \leq \psi \leq 78^\circ$.

4. (Original) The single crystal substrate according to claim 3, wherein optimal Euler angles of the langasite are $\phi = 0^\circ$, $\theta = 14.6^\circ$ and $\psi = 76.2^\circ$.

5. (Original)A single crystal substrate comprising:

a quartz substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis, and the substrate further has an Z'-axis perpendicular to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the quartz substrate having a crystal orientation defined

by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which ϕ is in a range of $-5^\circ \leq \phi \leq +5^\circ$, θ is in a range of $60^\circ \leq \theta \leq 80^\circ$ and ψ is in a range of $-5^\circ \leq \psi \leq +5^\circ$.

6. (Original) The single crystal substrate according to claim 5, wherein optimal Euler angles of the quartz are $\phi = 0^\circ$, $\theta = 70.5^\circ$ and $\psi = 0^\circ$.

7. (Original) A single crystal substrate comprising:

a quartz substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis, and the substrate further has an Z'-axis perpendicular to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the quartz substrate having a crystal orientation defined by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which ϕ is 0°, θ is in a range of $17^\circ \leq \theta \leq 23^\circ$ and ψ is in a range of $10^\circ \leq \psi \leq 20^\circ$.

8. (Original) The single crystal substrate according to claim 7, wherein optimal Euler angles of the quartz are $\phi = 0^\circ$, $\theta = 20^\circ$ and $\psi = 13.7^\circ$.

9. (Original) A single crystal substrate comprising:

a lithium tantalate substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis, and the substrate further has an Z'-axis perpendicular to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the lithium tantalate substrate having a crystal orientation defined by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which ϕ is in a range of $-5^\circ \leq \phi \leq +5^\circ$, θ is in a range of $70^\circ \leq \theta \leq 90^\circ$ and ψ is in a range of $85^\circ \leq \psi \leq 95^\circ$.

10. (Original) The single crystal substrate according to claim 9, wherein optimal Euler angles of the lithium tantalate are $\phi = 0^\circ$, $\theta = 79^\circ$ and $\psi = 90^\circ$.

11. (Original) A single crystal substrate comprising:

a lithium tantalate substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis, and the substrate further has an Z'-axis perpendicular normal to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the lithium tantalate substrate having a crystal orientation defined by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which ϕ is in a range of $-5^\circ \leq \phi \leq +5^\circ$, θ is in a range of $160^\circ \leq \theta \leq 180^\circ$ and ψ is in a range of $85^\circ \leq \psi \leq 95^\circ$.

12. (Original) The single crystal substrate according to claim 11, wherein optimal Euler angles of the lithium tantalate are $\phi = 0^\circ$, $\theta = 168^\circ$ and $\psi = 90^\circ$.

13. (Original) A single crystal substrate comprising:

a lithium tantalate substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis, and the substrate further has an Z'-axis perpendicular to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the lithium tantalate substrate having a crystal orientation defined by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which ϕ is in a range of $-5^\circ \leq \phi \leq +5^\circ$, θ is in a range of $20^\circ \leq \theta \leq 40^\circ$ and ψ is in a range of $5^\circ \leq \psi \leq 25^\circ$.

14. (Original) The single crystal substrate according to claim 13, wherein optimal Euler angles of the lithium tantalate are $\phi = 0^\circ$, $\theta = 30^\circ$ and $\psi = 16.5^\circ$.

15-18. (Cancelled)

19. (New) A single crystal substrate comprising:

a langasite substrate with a SAW propagation surface; and

input and output IDTs having electrodes on the surface for launching and/or detecting surface acoustic waves, wherein a direction of surface wave propagation is parallel to an X'-axis,

and the substrate further has an Z'-axis perpendicular to the surface and a Y'-axis parallel to the surface and perpendicular to the X'-axis, the langasite substrate having a crystal orientation defined by modified axes X, Y and Z, the relative orientation of axes X', Y' and Z' being defined by Euler angles ϕ, θ and ψ, in which optimal Euler angles of the langasite are $\phi = 10^{\circ}$, $\theta = 23.6^{\circ}$ and $\psi = 78.8^{\circ}$ such that a power flow angle and a first order temperature coefficient of delay are substantially zero (0).

20. (New) A cutting method of a single crystal substrate comprising the steps of:

(a) defining a crystal orientation based on modified axes X, Y and Z, for the surface of the single crystal substrate which surface acoustic waves are propagated;

(b) defining X', Y' and Z' axes on the single crystal substrate, in which a direction of surface wave of the propagation is parallel to X'-axis and the Z'-axis is perpendicular to the surface wave and the Y'-axis is parallel to the surface and normal to the X'-axis;

(c) defining the X', Y' and Z' axes defined at (b) as relative orientation Euler angles of crystals, ϕ, θ and ψ; and

(d) setting a range of the ϕ, θ, and ψ defined at (c) in an optimal range in accordance with a type of the substrate, wherein the single crystal substrate is one of a langasite substrate, a quartz substrate and a lithium tantalite substrate,

when the single crystal substrate is the langasite substrate, selecting the range of the ϕ, θ, and ψ to be either that $\phi = 10^{\circ}$, $\theta = 23.6^{\circ}$ and $\psi = 78.8^{\circ}$ such that a power flow angle and a first order temperature coefficient of delay are substantially zero (0), or that ϕ is 0°, θ is in a range of $12^{\circ} \leq \theta \leq 17^{\circ}$, and ψ is in a range of $73^{\circ} \leq \psi \leq 78^{\circ}$;

when the single crystal substrate is the quartz substrate, selecting the range of the ϕ, θ, and ψ to be either that ϕ is in a range of $-5^{\circ} \leq \phi \leq +5^{\circ}$, θ is in a range of $60^{\circ} \leq \theta \leq 80^{\circ}$ and ψ is in a range of $-5^{\circ} \leq \psi \leq +5^{\circ}$, or that ϕ is 0°, θ is in a range of $17^{\circ} \leq \theta \leq 23^{\circ}$ and ψ is in a range of $10^{\circ} \leq \psi \leq 20^{\circ}$;

when the single crystal substrate is the lithium tantalite substrate, selecting the range of the ϕ, θ, and ψ to be either that ϕ is in a range of $-5^{\circ} \leq \phi \leq +5^{\circ}$, θ is in a range of $70^{\circ} \leq \theta \leq 90^{\circ}$ and ψ is in a range of $85^{\circ} \leq \psi \leq 95^{\circ}$, or that ϕ is in a range of $-5^{\circ} \leq \phi \leq +5^{\circ}$, θ is in a range of $160^{\circ} \leq \theta \leq 180^{\circ}$ and ψ is in a range of $85^{\circ} \leq \psi \leq 95^{\circ}$.

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